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Original article

IS PREDICTION OF RENAL FAILURE WITH ITS INDICES FEASIBLE WITH PRESENCE OF HISTOPATHOLOGIC EVIDENCE FOR GASTRIC INTESTINAL METAPLASIA?

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Abstract: **Objectives:** Gastric intestinal metaplasia has traditionally been associated with gastric adenocarcinoma. Gastric intestinal metaplasia is usually related to the *Helicobacter pylori* infection, older ages, smoking history, and consumption of strong spicy foods, socioeconomic status presence of IL10-592 C/A. The purpose of the present research study was to evaluate the simple laboratory parameters in subjects with gastric intestinal metaplasia.

Findings: From May 2018 and October 2018, a total of 541, 281 male and 260 female, consecutive cases with gastric intestinal metaplasia with the mean age of 58.5 ± 15 years had been enrolled retrospectively with the exclusion of the cases with severe underlying disease, including the gastric cancer and gastric resection. The gastroscopy with the antral biopsy had been performed for all the cases and the biopsy samples had been evaluated for the presence of gastric intestinal metaplasia by Hematoxylin and Eosin and *Helicobacter pylori* status by Giemsa. The chi-squared test and independent *t* test were used for the comparison. The mean serum urea level detected as 34.2. ± 16.1 mg/dL in the gastric intestinal metaplasia and 31.2 ± 13.1 mg/dL in the control (95% CI from 32,3 to 34,6; $p = 0.013$), while the mean serum creatinin level 0.84 ± 0.28 mg/dL in the gastric intestinal metaplasia and 0.80 ± 0.26 mg/dL in the control (95% CI from 0,80 to 0,85; $p = 0.042$). The gastric intestinal metaplasia was detected mostly in elderly and male, regarding the multiple logistic regression ($p < 0.001$).

Conclusion: The serum urea and creatinin levels may serve as a simple clinical tool to predict the cases patients at risk for gastric intestinal metaplasia.

Key words: Metaplasia; Intestinal metaplasia; Endoscopy; Histopathology; Hematoxylin; Helicobacter pylori; Renal insufficieny; Urea; Creatinin.

INTRODUCTION

Gastric intestinal metaplasia (GIM), characterised by either the enteric or colonic mucosal immigration into the gastric mucosa, is prevalent in subjects, living in Asia and could lead to the gastric carcinoma at a rate of approximately 1%, annually (1). Both atrophic gastritis and GIM have been implicated in the gastric carcinogenesis and should be tracked by endoscopic screening programmes (2). The risk factors have been reported as the presence of *Helicobacter pylori* infection, older ages, smoking history, strong spicy food consupmtion, occupation status and presence of IL10-592 C/A (3). However, the role of facilitative laboratory tools to detect GIM remains largely unknown.

AIM

In the present study, it is purposed to explore the possible impact and association of established GIM on the basic laboratory parameters as well as the sociodemographic factors.

MATERIAL AND METHODS

Criteria for incorporation into the study

A sum of 541 (281 male and 260 female) consecutive cases with GIM with the mean age of 58.5 ± 15 years had been enrolled retrospectively, during the period between May 2018 and October 2018. The related documents and data had been collected and evaluated. Gastroscopy with the antral biopsy had been performed for all the cases at the enrollment of the present study. The control group (90 male and 90 female) with the mean age of 54.6 ± 13.5 years was selected from the dyspeptic cases without GIM. The exclusion criteria were the cases with severe underlying disease, including the gastric cancer and the gastric resection.

Endoscopic and Histopathologic evaluation

All the endoscopic examinations had been performed by using the propophol anestesia with Fujinon videoscope (Tokyo, Japan). The biopsy samples had been evaluated for the presence of GIM and *Helicobacter pylori* status. The gastric biopsy specimens had been fixed in a formalin and assessed for *Helicobacter pylori* by Giemsa and intestinal metaplasia by Hematoxylin and Eosin, and the intestinal metaplasia had been classified in two grades: absent and present.

Statistical analysis

All the statistical analyses were performed with the SAS software (SAS Institute, Cary, N.C.). The demographic clinical and radiologic characteristics of the cases were compared by the Student's t-test exact test to assess the difference in the proportions. All the p values were two-sided and the significance was indicated by a p value of less than 0.05.

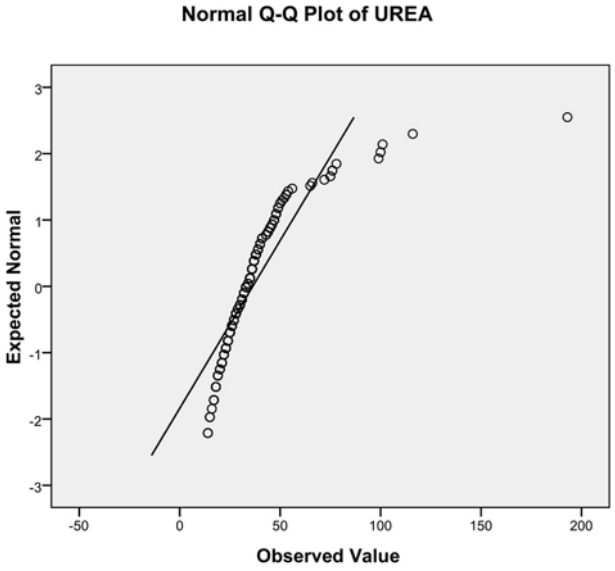

Figure 1a: *The normal Q-Q plot of serum urea*

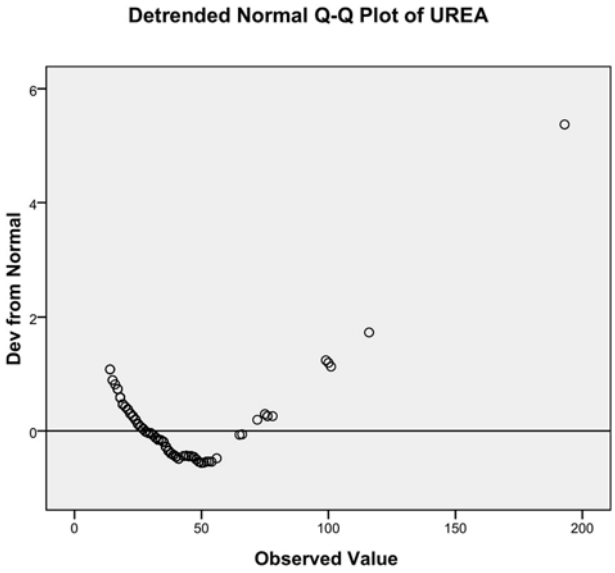

Figure 1b: *The detrended normal Q-Q plot of serum urea*

RESULTS

The characteristics of the cases at the baseline were well balanced between the studied cases and the control subjects with respect to age and gender (all $p > 0.05$). The baseline characteristics of the study subjects are depicted in Table 1. The mean serum urea level was 34.2 ± 16.1 mg/dL in the GIM group and was 31.2 ± 13.1 mg per deciliter in the control group (95% CI from 32.3 to 34.6; $p = 0.013$). The mean serum creatinin level was 0.84 ± 0.28 mg/dL in GIM group and was 0.80 ± 0.26 mg/dL in control group (95% CI from 0.80 to 0.85; $p = 0.042$). The further statistical analyses of those parameters for the serum urea levels (Figure1a, b) and serum creatinin levels (Figure 2a, b)

Table 1. *The baseline characteristics of the cases*

Group Statistics

	GIM	n	Mean	Std. Deviation	Std. Error Mean
Age	0	180	54,68	13,555	1,010
	1	541	58,58	15,077	,648
Urea	0	171	31,2339	13,16918	1,00707
	1	509	34,2224	16,11630	,71434
Creatinin	0	177	,8053	,26141	,01965
	1	514	,8486	,28824	,01271

GIM: Gastric intestinal metaplasia.

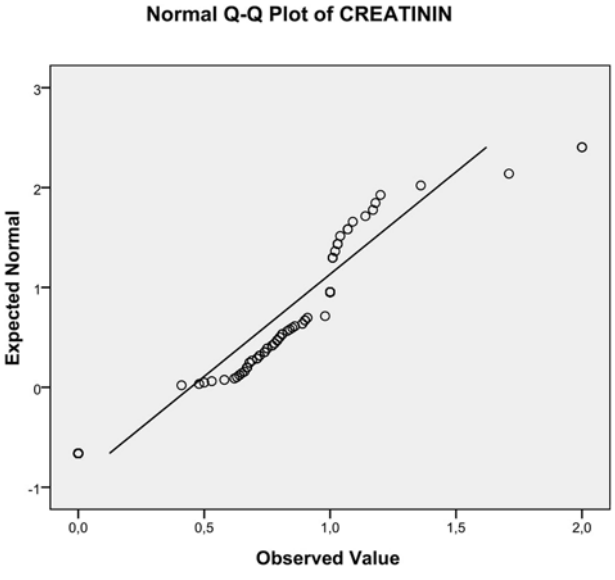

Figure 2a: *The normal Q-Q plot of serum creatinin*

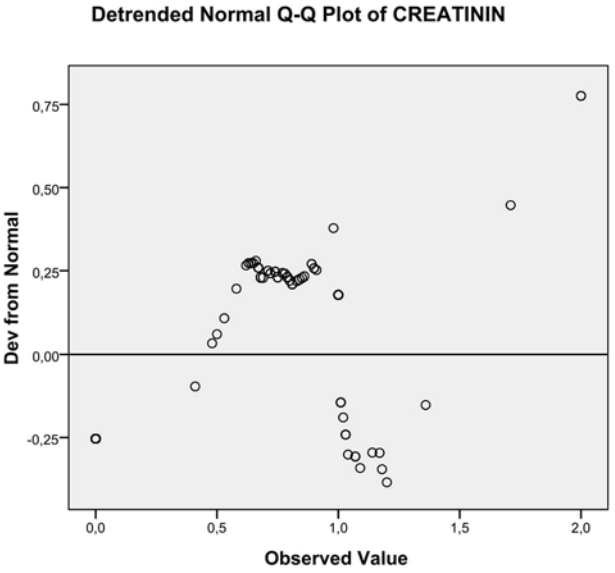

Figure 2b: *The detrended normal Q-Q plot of serum creatinin*

were depicted, seperately. According to the multiple logistic regression, GIM was more in elderly and male gender was a strong risk factor for GIM (all $p <$ 0.001). The other variables were similar across the groups (p = NS).

DISCUSSION

In the present study, the mean rate of *H. pylori* infection was 56% and did not differ between the groups (54% versus 58%). We also reported an original research study very recently, on December 2018, about frequency of *Helicobacter pylori* and association of location, six age groups, and assessment of borderline of 50-year base-age, based on the anatomic pilot region with the degree of helicobacter pylori colonization. We reported in our other study that the *Helicobacter pylori* positivity was 55.2% in general and observed mostly in the antrum and 45-64 age group. However, no any difference was detected between the location, age groups, subgroups with over and under 50 and the degree of *Helicobacter Pylori* colonization (4). Some other already published Turkish studies (5) have revealed the similar results, where as some reported the different, higher (6) and lower (7), ratios with our two research studies about *Helicobacter pylori*.

A recent study from the United States involving 4.146 individuals with the gastric intestinal metaplasia exhibited that the incidence rate of the gastric adenocarcinoma was 0,72/1.000 person-years in patients with the intestinal metaplasia, with a relative risk of 2,56 compared with the control group (8). The gastric cancer screening with the upper gastrointestinal tract endoscopy should be considered in persons who was born in the high risk areas for the gastric cancer (East Asia, Russia, and South America) or who had a family history of the gastric cancer. The gastric screening by endoscopy should be done every 1 to 2 years in the patients with the findings of atrophic gastritis or intestinal metaplasia on their histopathologic assessments (9). The emerging evidence also suggests that the preexisting GIM detected by histopathologic examination of the gastric mucosa confers a longterm risk of gastric cancer even after the *Helicobacter pylori* infection has been successfully eliminated (10). In a recent retrospective cohort study involving 923 patients with GIM showed that only family history (the hazard ratio, 3,8-95% and the confidence interval, 1,5–9,7; p = 0.012) and the extent of GIM (the odds ratio, 9.4-95% and the confidence interval, 1,8–50,4%) increased the risk for the gastric cancer (11). It was not obtained that data due to the retrospective nature of the present study.

It has been a well known fact that the tobacco smoking and many foods, including processed, salted or smoked meats are positively associated with a noncardia gastric cancer in a dose-dependent manner (12). To our knowledge, only few studies present in the English literature, regarding the intestinal metaplasia in the patients with the chronic kidney disease. The first study conducted a quarter century ago involving 80 patients with the chronic renal failure, revealing 50 patients (62.5%) had the intestinal metaplasia (13). In a study of Netto et al (14), 96 patients with the chronic kidney disease were endoscopied as the preparation for kidney transplantation. The most frequent found gastric disorder was a pangastritis (57,30%) and erosive pangastritis was found with 30,2%. The gastric metaplasia was found in 8,33%, which is much less than in the study of 1989. Another study with 50 chronic renal failure patients and 50 control patients revealed the intestinal metaplasia in 29,4% of the cases in the renal failure group. **In conclusion**, a higher urea concentration in the gastric juice and following metabolic disorders were regarded as a causative for the higher frequency of gastrointestinal alterations compared with the patients with a normal renal function (15). The data above suggest that the renal dysfunctional alter the gastric mucosal tissue with the formation of the toxic products, which may play a potential pathogenic role in GIM.

There are several important limitations of the study. First of all, in the present study was in a retrospective manner. Secondly, it was not obtained the serum bicarbonate levels among the study population. Thirdly, it was not assessed the renal functions through the sonographic assessment, and lastly, it was not collected the dietary behaviours of the subjects with GIM,

those lead to that disease. On the other hand, it is expected that the current study is large enough to assess the impact of GIM on the renal parameters.

CONCLUSION

Assessing serum urea and creatinin levels could serve as the simple clinical tool to identify the patients at risk for GIM as well as the further gastric cancer. Given the previously reported GIM prevalence, full biochemical screening may reveal the substantial numbers of cases with the previously unknown GIM.

Abbreviation

GIM — Gastric intestinal metaplasia

DECLARATION OF INTEREST

The authors declare that there are no conflicts of interest.

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Licensing

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Sažetak

DA LI JE UZ POMOĆ ODGOVARAJUĆIH INDEKSA MOGUĆA PREDIKCIJA BUBREŽNOG POPUŠTANJA KOD PACIJENATA SA HISTOPATOLOŠKOM POTVRDOM GASTROINTESTINALNE METAPLAZIJE?

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Ciljevi: Gastrointestinalna metaplazija je tradicionalno povezivana sa gastričnim adenokarcinomom. Gatrointestinalna metaplazija je obično povezana sa infekcijom Helicobacter pylori, starijom životnom dobi, pušenjem, konzumacijom jako začinjene hrane, socioekonomskim statusom i prisustvom IL10-592 C/A. Svrha ove studije bila je da se procene jednostavni laboratorijski parametri kod ispitanika sa gastrointestinalnom metaplazijom. **Rezultati:** Od maja 2018. do oktobra 2018. godine, ukupno 541 pacijent, od kojih su 281 muškarci, a 260 žene, sa gastrointestinalnom metaplazijom i srednjom starošću 58.5 ± 15, uključeni su retrospektivno u studiju, sa isključenjem pacijenata sa teškom osnovnom bolešću, uključujući rak želuca i resekciju želuca. Svim pacijentima je izvršena gastroskopija sa antralnom biopsijom, a uzorci biopsije su evaluirani na prisustvo gastrointestinalne metaplazije, korišćenjem Hematoksilina i Eozina, i statusa Helicobacter pylori (Giemza). Za poređenje i analizu su korišćeni hi-kvadrat test u nezavisni t test. Srednja vrednost koncentracije uree u serumu je bila 34.2 ± 16.1 mg/dL u gastrointestinalnoj metaplaziji i 31.2 ± 13.1 mg/dL u kontrolnoj grupi (95% CI od 32,3 do 34,6; p = 0.013), dok je srednja vrednost nivoa kreatinina u serumu 0.84 ± 0.28 mg/dL u gastrointestinalnoj metaplaziji i 0.80 ± 0.26 mg/dL u kontrolnoj grupi (95% CI from 0,80 to 0,85; p = 0.042).

Zaključak: Nivoi uree i kreatinina u serumu mogu poslužiti kao jednostavan klinički parametar za predviđanje slučajeva pacijenata sa rizikom od gastrointestinalne metaplazije.

Ključne reči: metaplazija, intestinalna metaplazija, endoskopija, histopatologija, hemotoksilin, helicobacter pylori, bubrežna insuficencija, urea, kreatinin.

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